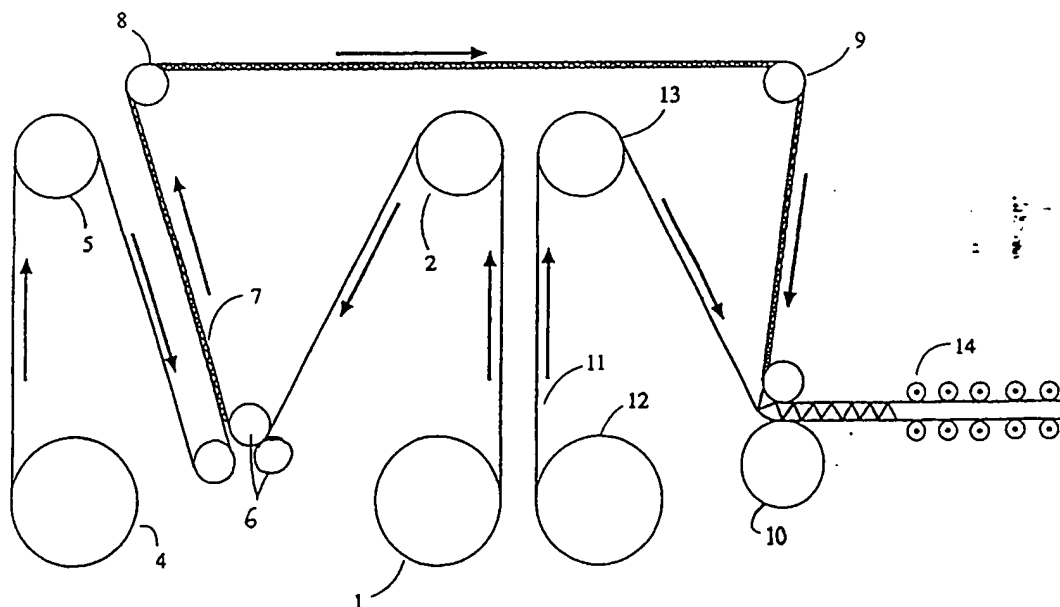




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification ⁶ : B32B 29/08, B65D 65/40, B31F 1/28</p>	<p>A1</p>	<p>(11) International Publication Number: WO 98/41400 (43) International Publication Date: 24 September 1998 (24.09.98)</p>
<p>(21) International Application Number: PCT/NZ98/00036 (22) International Filing Date: 16 March 1998 (16.03.98) (30) Priority Data: 314427 17 March 1997 (17.03.97) NZ (71) Applicant (for all designated States except US): INSUL-BOX (NZ) LIMITED [NZ/NZ]; 72 Charles Prevost Drive, Manurewa, Auckland 1702 (NZ). (72) Inventor; and (75) Inventor/Applicant (for US only): HARRISON, Wayne, John [NZ/NZ]; 72 Charles Prevost Drive, Manurewa, Auckland 1702 (NZ). (74) Agents: WELLS, Ceri, P., K. et al.; 29 Clarence Street, P.O. Box 759, Hamilton 2001 (NZ).</p>		<p>(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).</p> <p>Published With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</p>

(54) Title: PROCESS AND DEVICE FOR MAKING A CORRUGATED SHEET FOR CONTAINERS



(57) Abstract

The present invention relates to a method of forming a laminated material comprising the steps of corrugating a paper sheet (1), and applying a liner (4) to one or both sides of the corrugated sheet, wherein the liner is a pre-made laminate of a paper backing and plastic film which is metallised on one side and corona treated on the other side. A laminating apparatus for use in the above method is also described herein, which includes a means for feeding out a paper sheet and a liner to a set of corrugating rollers (6), the liner being a pre-formed laminate of paper and plastics film, and means for uniting the paper sheet and liner immediately subsequently to the corrugation of the paper sheet.

PROCESS AND DEVICE FOR MAKING A CORRUGATED SHEET FOR CONTAINERS

TECHNICAL FIELD

This invention relates to containers and in particular containers used for transportation and storing chilled or frozen foods.

BACKGROUND ART

Chilled or frozen foods are commonly packed in insulated containers. In one example expanded foams are commonly used for providing insulation properties. The material however has low impact resistance and is not generally regarded as having sufficient structural integrity for packaging applications and as a result the foam is often protected by an outside box. In addition, expanded foams are not approved for food contact applications and food within such containers consequently needs to be bagged or wrapped.

Metal foils are also used in packaging situations to provide insulation properties.

The use of expanded foam insulation materials in packaging is not regarded as ideal because the material is bulky and in addition there are recognised disposal problems.

Metal foils present manufacturing problems, additional costs, physical properties are not compatible with machinery and standard processing techniques and consequently tend to be used only for smaller higher value items.

As an alternative packaging material, cardboard has good natural insulation qualities, which can be improved if a board is laminated, lamination also improving strength.

It is an object of the present invention to provide a method and apparatus for producing insulated containers with corrugated board as a core material.

The lamination of the paper sheet and liner with the second liner can be subsequent to the lamination of the paper sheet with the liner.

The lamination of the paper sheet and the liner with the second liner can be achieved with the assistance of a cluster of in-line pressure rollers.

The second liner can be a laminate of a plastics film and paper.

The paper used to form the laminate can be of various thicknesses and grades and within the definition of paper it is intended to include thicker semi-rigid paper sheets (cardboard) and recycled and composite sheet materials including cellulose fibres derived from a variety of materials.

BRIEF DESCRIPTION OF DRAWINGS

Aspects of the present invention will be described in relation to the accompanying drawing which is a schematic side view of apparatus in accordance with the present invention set up to produce a two or three ply laminate.

BEST MODES FOR CARRYING OUT THE INVENTION

With respect to the drawing a roll of paper 1 is threaded over a heating roller 2 and fed to corrugating rollers 6. Simultaneously a liner material is fed from a roll 4 over a pre-heating roller 5 to the corrugating rollers 6 and laminated to one side of corrugated laminar 7 with the laminar being fed via rollers 8, 9 to nip rollers 10, where (optionally) a liner 11 from a roll 12 is fed via pre-heating roller 13 to the nip rollers 10 to provide a lining to the other side of the laminar. A cluster of crushing and heating rollers 14 are positioned downstream of the nip rollers 10 through which the completed laminar is fed. Downstream of the lamination apparatus the completed laminate is stored and cured prior to cutting into box blanks. Containers can be erected from the box blanks.

after corrugating. This time is necessary for the curing process i.e. cooling of the board and the moisture balance to finalise.

Whilst it has been known to laminate sheet material such as cardboard with plastics film in the past, this has never been done using a corrugator. Despite advice to the contrary our process has made this possible, the key factor we believe being the pre-made liner material, a laminate of polyester metallised film and a light paper backing. The paper backing resists stretching and minimises the distribution of heat during the laminating process.

Aspects of the present invention have been described by way of example only and it should be appreciated that modifications and additions may be made thereto without departing from the scope thereof as defined in the appended claims.

9. Laminating apparatus as claimed in claim 7 or claim 8 including means for feeding a second liner for lamination with the first paper sheet.
10. Laminating apparatus as claimed in claim 9 wherein the lamination of the paper sheet and liner with the second liner is subsequent to the lamination of the paper sheet with the liner.
11. Laminating apparatus of 9 or claim 10 wherein the lamination of the paper sheet and the liner with the second liner is achieved with the assistance of a cluster of in-line pressure rollers.
12. Laminating apparatus as claimed in any one of claims 9 to 11 wherein the second liner is a laminate of a plastics film and paper.
13. A container formed from a laminate manufactured in accordance with the method of any one of claims 1 to 6.
14. A method of forming a laminated sheet material substantially as herein described with reference to the accompanying drawings.
15. Laminating apparatus substantially as herein described with reference to the accompanying drawings.

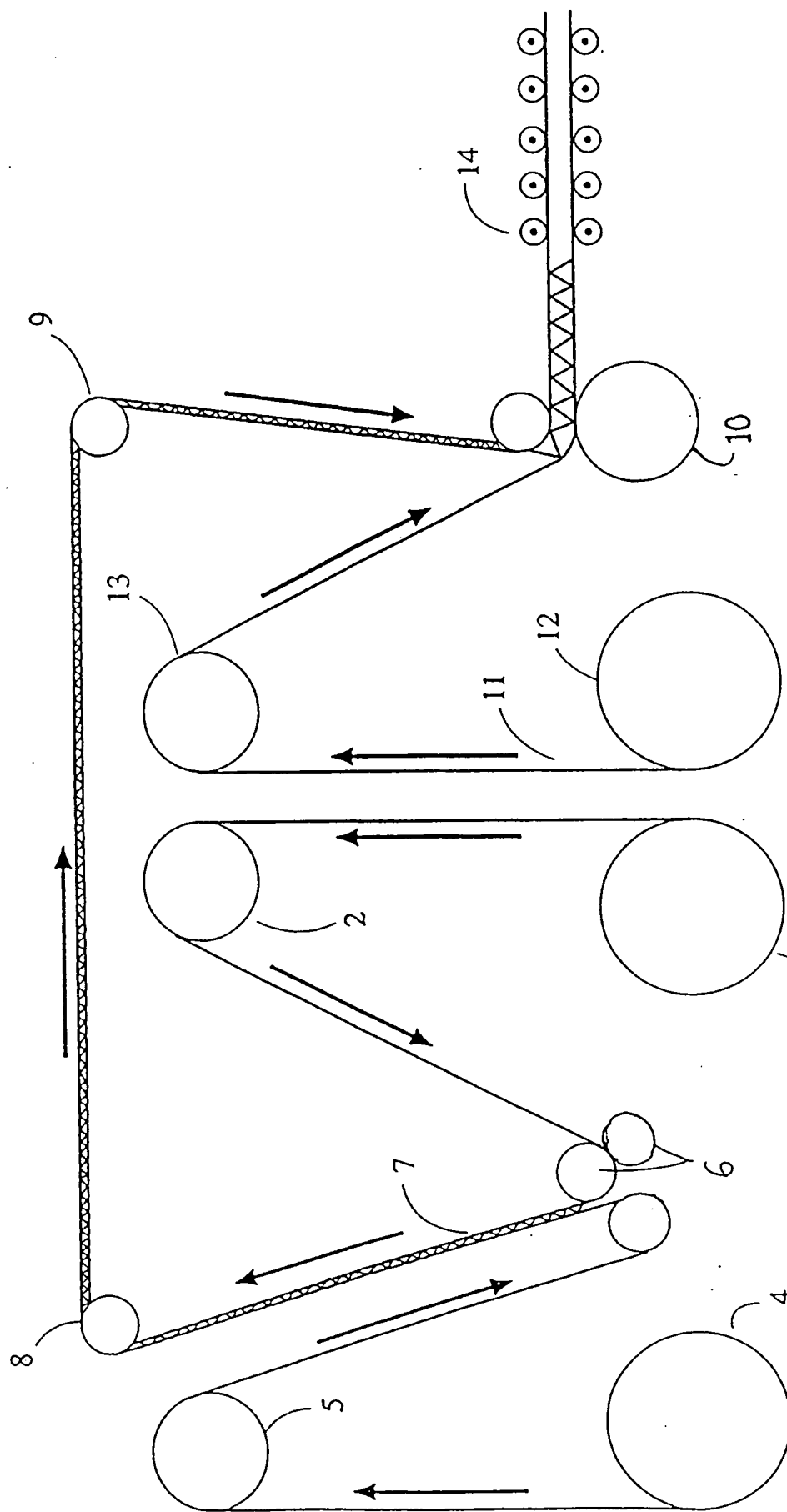


Figure 1

THE CLAIMS DEFINING THE INVENTION ARE:

1. A method of forming a laminated material comprising the steps of corrugating a paper sheet and applying a liner to one or both sides of the corrugated sheet said liner being a pre-made laminate of a paper backing and polyester film which is metallised on one side and corona treated on the other side.
2. A method as claimed in claim 1 wherein the plastics film is bi-axially oriented metallised polyester film.
3. The method of claim 1 or claim 2 wherein the liner is preheated prior to its application to the paper sheet.
4. The method of claims 1 to claim 3 wherein the liner is heated by heating rollers and adhered to the paper sheet using a PVA adhesive with the metallised film of the liner outermost.
5. The method of any one of claims 1 to 3 wherein the liner is heated by heating rollers and adhered to the paper sheet using a PVA adhesive with the metallised film of the liner innermost.
6. A method as claimed in any one of claims 1 to 5 wherein the plastics metallised liner is laminated to one side of the paper sheet as the paper laminar is fed from the corrugating rollers.
7. Laminating apparatus including means for feeding out a paper sheet and a liner to a set of corrugating rollers, the liner being a pre-formed laminate of paper and metallised polyester film, and means for uniting the paper sheet and liner immediately subsequently to the corrugation of the paper sheet.
8. Laminating apparatus as claimed in claim 7 including means for pre-heating the paper sheet and liner prior to them being united.

9. Laminating apparatus as claimed in claim 7 or claim 8 including means for feeding a second liner for lamination with the first paper sheet.
10. Laminating apparatus as claimed in claim 9 wherein the lamination of the paper sheet and liner with the second liner is subsequent to the lamination of the paper sheet with the liner.
11. Laminating apparatus of 9 or claim 10 wherein the lamination of the paper sheet and the liner with the second liner is achieved with the assistance of a cluster of in-line pressure rollers.
12. Laminating apparatus as claimed in any one of claims 9 to 11 wherein the second liner is a laminate of a metallised plastics film and paper.
13. A container formed from a laminate manufactured in accordance with the method of any one of claims 1 to 6.
14. A method of forming a laminated sheet material substantially as herein described with reference to the accompanying drawings.
15. Laminating apparatus substantially as herein described with reference to the accompanying drawings.

PATENT COOPERATION TREATY

PCT

NOTICE INFORMING THE APPLICANT OF THE
COMMUNICATION OF THE INTERNATIONAL
APPLICATION TO THE DESIGNATED OFFICES

(PCT Rule 47.1(c), first sentence)

From the INTERNATIONAL BUREAU

To:

WELLS, Ceri, P., K.
29 Clarence Street
P.O. Box 759
Hamilton 2001
NOUVELLE-ZELANDE

Date of mailing (day/month/year) 24 September 1998 (24.09.98)		IMPORTANT NOTICE	
Applicant's or agent's file reference 23865/16X006			
International application No. PCT/NZ98/00036	International filing date (day/month/year) 16 March 1998 (16.03.98)	Priority date (day/month/year) 17 March 1997 (17.03.97)	
Applicant INSUL-BOX (NZ) LIMITED et al			

1. Notice is hereby given that the International Bureau has communicated, as provided in Article 20, the international application to the following designated Offices on the date indicated above as the date of mailing of this Notice:
AU,BR,CA,CN,EP,IL,JP,KP,KR,NO,PL,US

In accordance with Rule 47.1(c), third sentence, those Offices will accept the present Notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

2. The following designated Offices have waived the requirement for such a communication at this time:
AL,AM,AP,AT,AZ,BA,BB,BG,BY,CH,CU,CZ,DE,DK,EA,EE,ES,FI,GB,GE,GH,HU,IS,KE,KG,KZ,LC,
LK,LR,LS,LT,LU,LV,MD,MG,MK,MN,MW,MX,NZ,OA,PT,RO,RU,SD,SE,SG,SI,SK,SL,TJ,TM,TR,TT,
UA,UG,UZ,VN,YU,ZW
The communication will be made to those Offices only upon their request. Furthermore, those Offices do not require the applicant to furnish a copy of the international application (Rule 49.1(a-bis)).
3. Enclosed with this Notice is a copy of the international application as published by the International Bureau on
24 September 1998 (24.09.98) under No. WO 98/41400

REMINDER REGARDING CHAPTER II (Article 31(2)(a) and Rule 54.2)

If the applicant wishes to postpone entry into the national phase until 30 months (or later in some Offices) from the priority date, a demand for international preliminary examination must be filed with the competent International Preliminary Examining Authority before the expiration of 19 months from the priority date.

It is the applicant's sole responsibility to monitor the 19-month time limit.

Note that only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination.

REMINDER REGARDING ENTRY INTO THE NATIONAL PHASE (Article 22 or 39(1))

If the applicant wishes to proceed with the international application in the national phase, he must, within 20 months or 30 months, or later in some Offices, perform the acts referred to therein before each designated or elected Office.

For further important information on the time limits and acts to be performed for entering the national phase, see the Annex to Form PCT/IB/301 (Notification of Receipt of Record Copy) and Volume II of the PCT Applicant's Guide.

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer J. Zahra
Facsimile No. (41-22) 740.14.35	Telephone No. (41-22) 338.83.38

Continuation of Form PCT/IB/308

**NOTICE INFORMING THE APPLICANT OF THE COMMUNICATION OF
THE INTERNATIONAL APPLICATION TO THE DESIGNATED OFFICES**

Date of mailing (day/month/year) 24 September 1998 (24.09.98)	IMPORTANT NOTICE
Applicant's or agent's file reference 23865/16X006	International application No. PCT/NZ98/00036
<p>The applicant is hereby notified that, at the time of establishment of this Notice, the time limit under Rule 46.1 for making amendments under Article 19 has not yet expired and the International Bureau had received neither such amendments nor a declaration that the applicant does not wish to make amendments.</p>	

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

PCT

To:

James & Wells
Level 9 6B Cawley Street
Private Bag 11907 Ellerslie
1005 Auckland New Zealand

NOTIFICATION OF RECEIPT OF DEMAND BY COMPETENT INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

(PCT Rule 59.3(e) and 61.1(b), first sentence
and Administrative Instructions, Section 601(a))

Date of mailing 11 NOV 1998
(day/month/year) (11/11/98)

Applicant's or agent's file reference

23865 23815/16x006

IMPORTANT NOTIFICATION

International application No.

PCT/NZ98/00036

International filing date (day/month/year)

16 MAR 1998 (16/3/98)

Priority date (day/month/year)

17 MAR 1997 (17/3/97)

Applicant

Insulbox (NZ) Limited (et al.)

1. The applicant is hereby **notified** that this International Preliminary Examining Authority considers the following date as the date of receipt of the demand for international preliminary examination of the international application:

16 OCT 1998 (16/10/98)

2. That date of receipt is:



the actual date of receipt of the demand by this Authority (Rule 61.1(b)).



the actual date of receipt of the demand on behalf of this Authority (Rule 59.3(e)).



the date on which this Authority has, in response to the Invitation to correct defects in the demand (Form PCT/IPEA/404), received the required corrections.

3. ☐ **Attention:** That date of receipt is **AFTER** the expiration of 19 months from the priority date. Consequently, the elections(s) made in the demand does (do) not have the effect of postponing the entry into the national phase until 30 months from the priority date (or later in some Offices) (Article 39(1)). Therefore, the acts for entry into the national phase must be performed within 20 months from the priority date (or later in some Offices) (Article 22). For details, see the *PCT Applicant's Guide, Volume II*.



(If applicable) This notification confirms the information given by telephone, facsimile transmission or in person on:

4. Only where paragraph 3 applies, a copy of this notification has been sent to the International Bureau.

Name and mailing address of the IPEA/AU

AUSTRALIAN PATENT OFFICE
PO BOX 200, WODEN ACT 2606,
AUSTRALIA

Facsimile No. 02 6285 3929

Authorized officer

Mrs. Cecilia TRACEY
(02) 6283 2511

Telephone No.